

## ABSTRACT OF THE DISCLOSURE

Formal verification methods provide for improved efficiency of popular binary decision diagram (BDD) based algorithms. A lazy pre-image computation method builds new transition relation partitions on-demand for relevant internal variables of a state predicate, and conjoins only next state relations for relevant internal variables to a pre-image including the state predicate. A lazy fixpoint computation method makes iterative use of lazy pre-image computation to compute conditions that must be satisfied to produce a given set of states. A forward assumption propagation method generates assumptions to characterize a set of interesting states for a property being evaluated at one or more evaluation stages. A dynamic transition relation reduction improves the efficiency for symbolic model checking by reducing transition relations under assumptions dynamically generated from properties being evaluated. These methods provide symbolic model checking of circuits and other finite state systems previously too large to be completed successfully using BDD based algorithms.